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EXCREMENT TREATMENT MATERIAL FOR PETS AND ITS PRODUCTION

Seiichiro Sasahara

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EXCREMENT TREATMENT MATERIAL FOR PETS AND ITS PRODUCTION

[Pettoyoh haisetsubutsu shoriyohzai oyobi sono seizhoh houhoh]

Applicant:	395021000 Maeda Sentan Gijutsu Kenkyusho Co.
Inventor:	Seiichiro Sasahara

[There are no amendments to this patent.]

Claims

1. An excrement treatment material for pets characterized by the fact that the material comprises a flat granular body having a two-layered structure consisting of a flat core material made of hydrophilic organic fibers and a coating layer consisting of a water-absorbing polymer powder and an organic fiber powder that covers substantially the entire surface of the aforementioned core material at an approximately constant thickness.

2. The excrement treatment material for pets described in Claim 1 characterized by the fact that a surfactant is added to the flat core material consisting of hydrophilic organic fibers.

3. The excrement treatment material for pets described in Claim 1 or 2 characterized by the fact that water-soluble color pigments, perfumes, pH indicators such as methylene blue, etc. are added to the core material or coating layer.

4. A method of manufacturing an excrement treatment material for pets characterized by the fact that a water-absorbing polymer powder and an organic fiber powder are adsorbed on the entire surface of a hydrophilic organic fiber body to form a coating layer with a substantially constant thickness followed by rolling to form a flat granular body.

5. The method for manufacturing an excrement treatment material for pets described in Claim 4 characterized by the fact that the flat granular body is formed under a damp or wet condition.

Detailed explanation of the invention

[0001]

Technical field of the invention

The present invention pertains to an excrement treatment material for pets used for treating excrement of small animals such as cats and dogs, and to a method of manufacturing same.

[0002]

Prior art

As a convenient method for treating excrement deposited by small pets mainly kept indoors that has been used in the past, a method can be mentioned where a sheet-like or granular excrement treatment material capable of absorbing excrement is stored inside an excrement container and the aforementioned excrement treatment material is replaced periodically.

[0003]

In the aforementioned conventional excrement treatment material, polymers with high water absorption, organic fibers such as paper powder and wood powder, materials having water absorption such as clay minerals and zeolite or activated carbon (materials that absorb volatile substances such as odors), etc. are formed into a sheet or granules with a binder, for example, a thermoplastic resin such as polyvinyl alcohol or carboxymethylcellulose or hydroxyethylcellulose.

[0004]

The aforementioned material is capable of absorbing a constant amount of liquid excrement and volatile substances, and especially when an excrement treatment material

produced by mixing an organic fiber such as a wood powder or paper powder and a binder made of a water-soluble thermoplastic is used, either burning or flushing down the toilet is possible and it is widely used because of ease of handling and convenience.

[0005]

Problems to be solved by the invention

In the above-mentioned conventional excrement treatment material, when an organic material is used for the main component water-absorbing material and the material that absorbs volatile substances such as odors, the bulk density is low at approximately 0.3 to 0.4 even when clay minerals having a relatively high specific gravity are included to adjust the weight.

[0006]

Therefore, in a granular excrement treatment material having granules with a diameter of approximately 5 mm, stationary stability is insufficient before absorbing liquid excrement. As a result, when a small animal walks on it, the excrement treatment material is disturbed and scattered around the excrement container, and adequate absorption cannot be expected at the time of excretion by the small animal.

[0007]

Furthermore, when an attempt is made to increase water absorption while controlling collapsing of the shape of the excrement treatment material, the mixing ratio of the binder is limited as much as possible and the mixing ratio of the absorbing material is increased as much as possible, and in this case, the effect of the binder in a product is reduced, and the shape is destroyed by moisture accumulation and the area is soiled. Thus, it is difficult to achieve high absorption of liquid excrement of small animals and to control collapsing of the shape at the same time, and to increase both water absorption and cleanliness.

[0008]

Means to solve the problem

The present invention is intended to eliminate the above-mentioned problems of the prior art and the objective of the present invention is to produce a material having high shape stability and static stability and high water absorption, and in summary, the present invention is an excrement treatment material for pets characterized by the fact that the material comprises a flat granular body having a two-layered structure consisting of a flat core material made of hydrophilic organic fibers and a coating layer consisting of a water-absorbing polymer powder

and an organic fiber powder that covers substantially the entire surface of the aforementioned core material at an approximately constant thickness, and a method of manufacturing same.

[0009]

Embodiment of the invention

The present invention is explained in further detail below with application examples and drawings, and in Figure 1, 1 is an excrement material for pets of concern in the present invention, and this top view shows a circular or an elliptic flat granular body having an outer diameter of approximately 5 to 7 mm and thickness of approximately 2 mm.

[0010]

2 is a core material having a top view that is circular or elliptical in shape, and has a shape similar to the aforementioned excrement treatment material 1 and comprises an organic fiber powder such as pulp sludge or wood powder, and a coating layer 3 comprising a water-absorbing polymer powder such as polyvinyl alcohol, carboxymethylcellulose, or hydroxyethylcellulose and an organic fiber powder such as paper powder, wood powder, peat-moss powder, or rice bran powder is formed over substantially the entire surface of the aforementioned flat core material 2 at an approximately constant thickness.

[0011]

When excrement treatment material 1 has a two-layer structure with different functions consisting of core material 2 and coating layer 3 as described above, high water absorption can be expected and collapsing of the shape is absent even after absorption of water and a material with good shape retention can be produced. And furthermore, when the shape is a flat granular body, stationary stability can be improved despite the light weight, and at the same time, the contact angle between each excrement treatment material [granular body] 1, 1 is increased; thus, permeation of liquid inside the material and shifting of water among the granular bodies can be rapidly achieved and a structure is formed where collapsing of a part of excrement treatment material 1 as a result of excessive water retention does not occur.

[0012]

Furthermore, a method of manufacturing the aforementioned excrement treatment material 1 is explained in further detail with application examples shown in Figure 2 to Figure 4 below. First, a hydrophilic organic fiber 12A such as pulp sludge or wood powder having a size of approximately 1 to 5 mm when wet at a moisture content of 10 to 70 wt% is loaded into a

planar pelletizer or extrusion molding machine to form a flat granular body having a diameter of approximately 0.5 to 10 mm.

[0013]

In the pelletization process of the aforementioned granular core material 12, fuzz 12B and the water content of organic fiber 12A, that serves as a forming material, are important factors. In other words, the change in shape of organic fiber 12A is reduced based on the moisture in the forming material for mutual entanglement of the fiber, and when the aforementioned organic fiber 12A undergoes mutual entanglement based on shifting of the vaporization effect of the moisture, the shape is retained as is.

[0014]

Furthermore, fuzz 12B is not mixed with the water-absorbing polymer having water retention as well as adhesion, and the aforementioned granular core material 12 and the coating layer 13 described below that coats the surface of same are bonded via the aforementioned fuzz 12B so as to form a solid structure consisting of granular core material 12 and coating layer 13.

[0015]

Subsequently, the aforementioned granular core material 12 is transported to a coating machine and a prescribed amplitude of motion is applied to an application disc. In this case, granular core material 12 moves on the aforementioned application disc of the coating machine along the inside of the application disc while rotating, and the shape of the aforementioned granular core material 12 is compensated for to form substantially spherical granular bodies as shown in Figure 2.

[0016]

Furthermore, a specific amount of water-absorbing polymer powder and paper powder is placed inside the aforementioned application disc from separate supply ports. Coating layer 13 is formed where the aforementioned water-absorbing polymer powder and paper powder are adsorbed on the surface of granular core material 12 formed into substantially spherical granular bodies by the aforementioned amplitude motion of the application disc upon placement of the water-absorbing polymer powder and paper powder, and, at the same time, the aforementioned coating layer 13 is compacted and pressed against the surface of the aforementioned granular core material 12 and granular core material 12 and coating layer 13 form an integral structure.

[0017]

In this case, each of the aforementioned supply ports for the water-absorbing polymer powder and paper powder in the coating machine scatters the material at or near the center of the application disc, and the water-absorbing polymer powder and paper powder are slowly dispersed in the direction of shifting of the granular core material 12 that shifts along the application disc while it is rotating and are uniformly adsorbed over the entire surface of granular core material 12. Furthermore, the water-absorbing polymer powder and paper powder may be mixed ahead of time, and in this case, the material is supplied from one of the two supply ports.

[0018]

Furthermore, it is desirable if the water-absorbing polymer powder and paper powder are mechanically pulverized and have a specific size, and in the aforementioned application example, a maximum diameter in the range of 50 to 300 mesh is used for both powders. In this case, pulverized means crushing of the aforementioned polymer and paper powder by mechanical means to form a specific size, and a coating layer of a paper powder can be produced with an absence of the fuzz characteristics of a fiber. As a result, coating layer 13 is adsorbed onto granular core material 12 at a high-density and a smooth surface for coating layer 13 can be obtained.

[0019]

As described above, in the formation stage of the granular core material 12, it is not necessary to mix a binder, which is a water-absorbing polymer having moisture retention and adhesion, with the aforementioned forming material, and shape stability is achieved by forming the material of coating layer 13. In this case, the mixing ratio of the forming material that forms coating layer 13 is 1 to 2 of paper powder for 1 of the aforementioned water-absorbing polymer powder in terms of the weight ratio, and the total weight of coating layer 13 actually bonded is adjusted to 10 to 40% for the weight with respect to the granular core material 12.

[0020]

Furthermore, upon coating of the aforementioned granular core material 12 with the water-absorbing polymer powder and organic fiber powder, coating is done in such a manner that the entire surface of the granular core material 12 is coated uniformly at a nearly constant thickness, and when a granular core material 12 having a diameter of approximately 0.5 to 10 mm is used as in the case of the aforementioned application example, the diameter of the granular body 14 is increased to approximately 2 to 13 mm.

[0021]

Subsequently, the aforementioned granular body 14 is transported to a rotary system or vibration system drying chamber and each granular body 14 is dried thoroughly when appropriate energy that does not lead to collapsing of the granular body 14 is provided to the granular body 14. The aforementioned drying is provided for several minutes to several tens of minutes at a temperature of 60 to 100°C until the moisture content inside the granular body 14 is 2 to 20 wt%, preferably, 5 to 15 wt%.

[0022]

As a result of the aforementioned drying under heat, the moisture inside granular body 14 is reduced and the shape of coating layer 13 is stabilized, and at the same time, the diameter of the granular body 14 is reduced to approximately 0.5 to 8 mm. After drying, the material is removed from the drying chamber, natural drying or air drying based on an air blower is provided, and the material is cooled to air temperature (ambient temperature).

[0023]

And furthermore, the aforementioned granular body 14 is rolled in a rolling machine A such as a rotating roll to form a flat granular body 1A having substantially the same shape and the same size as granular body 1 shown in Figure 1. The rolling width (distance between rolls) at the time of the aforementioned rolling is in the range of 1 to 4 mm, preferably, in the range of 1 to 2 mm. In the aforementioned rolling process, the mutual entanglement among organic fibers 12A that structure the aforementioned granular core material 12 is relaxed slightly, space between organic fibers 12A is increased and flat granular body 1A with an improved capillary action is reduced.

[0024]

Furthermore, in the aforementioned rolling process, the aforementioned granular body 14 remains in a wet state (moisture content of approximately 5 to 15 wt%); thus, the adhesion of the water-absorbing polymer that comprises the structural material of coating layer 13 is utilized effectively, cracks in granular body 14 and peeling of coating layer 13 are less likely to occur, and production of a flat granular body 1A is made possible.

[0025]

And finally, the aforementioned flat granular body 1A is retained in a stationary state, hot-air drying is provided and the moisture content is adjusted to 5 to 10 wt%. Furthermore, when the material is left standing in air and cooled to ambient temperature, the target excrement

treatment material 1 formed into a flat granular body can be produced. It is further desirable when grading is done, for example, those having an ellipticity of 0.4 to 0.7 are selected to achieve constant quality.

[0026]

For application of the excrement treatment material of concern in the present invention, based on test results, the aforementioned excrement treatment material 1 produced by the above-mentioned method should be a flat granular body; thus, the material can be used to fill a specific excrement container and provide a reduced void ratio. When the specific gravity is compared with the substantially spherical granular bodies of the prior art (in this case, a granular body without a rolling process is used), the value is increased by approximately 0.16 to 0.2.

[0027]

Furthermore, the surface area of each excrement treatment material [body] 1 is increased since organic fibers 12A that form the core material 2 are appropriately disassociated for improved capillary effect and formed into a flat shape, and high water permeability inside the excrement treatment material 1 can be achieved, and at the same time, shifting of water among excrement treatment material [bodies] 1, 1 can be rapidly achieved.

[0028]

In other words, absorption of moisture is rapidly achieved at the surface of excrement treatment material 1 by the absorbing polymer with high water retention that forms the coating layer 3, and, at the same time, the aforementioned moisture retained at the surface rapidly permeates based on the capillary effect of organic fiber 12A that forms core material 2. And furthermore, when moisture exists beyond the water saturation limit, excess moisture is likely to move toward other excrement treatment material [bodies] 1 via the contact surface with adjacent excrement treatment material [bodies] 1, 1. Thus, expansion of the water-absorbing polymer of coating layer 3 as a result of excessive moisture applied to a specific area and collapsing of the shape of a part of the excrement treatment material can be prevented.

[0029]

Furthermore, the inner layer of the excrement treatment material 1 and the coating layer are formed taking properties of the materials into consideration, and a binder such as a thermoplastic resin with strong hydrophilic properties is not included in the coating layer 2 that structures the inner layer, collapsing when a specific amount of water is retained is less likely to occur in comparison to the case where molding is done with a mixture of an absorbing material

and a binder, and furthermore, when the excrement treatment material 1 is tossed into a high volume of water such as when it is tossed into the toilet, the water absorbing polymer that forms the coating layer 3 undergoes expansion and said coating layer 3 is rapidly dispersed in the water. Furthermore, the core material 2 left behind as a result is a granular body of organic fiber and collapsing of the shape is good and clogging of sewer pipes can be prevented.

[0030]

Furthermore, water is thoroughly absorbed inside the excrement treatment material 1 of the present invention as described above, and when the water absorbing factor is compared with the case where the material before rolling is used to fill the same container with 20 cc of water added to the container and with the weight of the granular body consumed measured, the consumption was 11 g in the material before rolling, but a reduction of up to 8 g was possible in the excrement treatment material of the present invention.

[0031]

Furthermore, when a small amount, for example, 1 to 2 wt%, of a surfactant capable of increasing the permeation effect, for example, a nonionic surfactant (product of Sanyo Kasei Co., Ltd. "Sanmorin 11" [transliteration]), is added to the coating layer 2 as a wetting agent in the present invention, water repellency of organic fiber 12A under a low moisture condition can be controlled, and an increase in efficiency of water absorption of the coating layer 2 can be expected. Furthermore, during the course of production, water-soluble colored pigments, perfumes, and pH indicators such as methylene blue can be added to coating layer 2 or coating layer 3 to provide an additional function to the product.

[0032]

Effect of the invention

The excrement material for pets of concern in the present invention has the structure described above, and essentially 100% of the structure comprises an organic absorbing material, the inner layer and coating layer of the structure are molded separately to obtain the features of each layer, the coating layer-inner layer structure is capable of stable retention of shape without adding a binder, and an excrement treatment material with high water absorption is made possible, and furthermore, the flat granular body provides high stationary stability, and the packing density in the excrement container can be increased, and a product with high water absorption and good application ease can be produced. Furthermore, the product offers many advantages, for example, disposal based on burning or flushing with a large amount of water is

made possible, so in homes, an easy disposal method such as flushing down a toilet or burning can be used, and sanitary handling after use can be achieved.

Brief description of the figures

Figure 1 is an enlarged vertical cross-sectional view of the excrement treatment material for pets of concern in the present invention.

Figure 2 is an explanatory enlarged cross-sectional view of the granular core material.

Figure 3 is an explanatory enlarged cross-sectional view of the granular body.

Figure 4 is an explanatory drawing of the rolling process.

Explanation of symbols

1	Excrement treatment material
1A	Flat granular body
2	Core material
3	Coating layer
12	Granular body
12A	Organic fiber
12B	Fuzz
13	Coating layer
14	Granular body

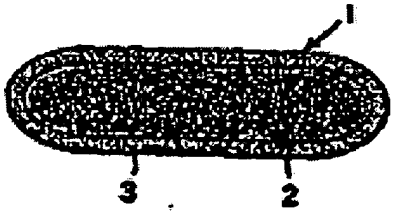


Figure 1

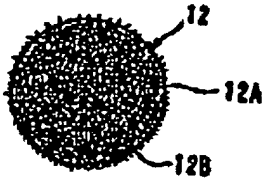
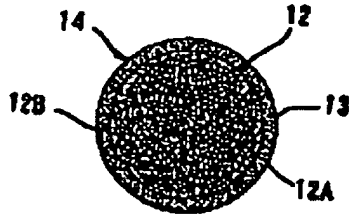


Figure 2



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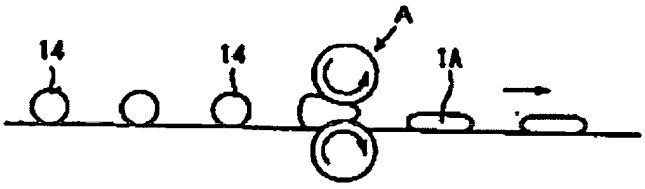

Figure 4